

Seed-eating Bugs (Hemiptera: Heteroptera: Lygaeidae) at Wilsons Promontory

BY ALAN N. ANDERSEN*

Lygaeid bugs (Fig. 1) are small to medium sized (generally 2-6 mm) insects with sucking mouth-parts that are found throughout the world. Most species are phytophagous and many feed upon seeds, either while the seeds are still developing on the plant or when they have fallen to the ground (Cremer, 1966; Malipatil, 1979; Sweet, 1960). Seed-eating is especially prevalent in the sub-family Rhyparochrominae, which contains about half of all known lygaeid species. Most Rhyparochrominae forage amongst litter on the ground, and many appear to subsist almost entirely on fallen seeds (Sweet 1960, 1964a, b). Most other phytophagous Lygaeidae forage predominantly on vegetation.

Although lygaeid bugs are unfamiliar to most people, some are quite well-known pests. For example the 'strawberry bug', *Euander lacertosus*, is a widely distributed ground-foraging lygaeid that is not only an economic pest of strawberries (Slater, 1976), but can seriously retard forestry seeding operations in southeastern Australia (Cremer, 1966). Similarly, the Rutherglen bug, *Nysius vinitor*, is a common pest of fruit and vegetable crops throughout Australia, and can occasionally cause serious damage (Kehat & Wyndham, 1972).

In comparison to many other insect groups, the taxonomy of Australian lygaeid bugs is known reasonably well (eg. Gross, 1962; Malipatil, 1978), but our knowledge of other facets of their biology is poor. Aspects of lygaeid biology have been reported for some regions, such as southwestern Western Australia (Slater, 1975, 1976) and southeastern Queensland (Malipatil, 1979), but there is little infor-

mation available on the lygaeid faunas elsewhere in Australia, including the cool and wet southeast.

This paper describes the lygaeid bugs collected during a four-year study of seed-



Fig. 1. Examples of lygaeid bugs from Wilson's Promontory. A. *Neolethaeus* sp. (dorsal view); B. *Myocara* sp. (lateral view); C. *Pseudodrymus* sp. (dorsal view).

* School of Botany, University of Melbourne, Parkville, Vic., 3052.

eating insects at Wilson's Promontory National Park, 200 km southeast of Melbourne. Information is given on habitat and host plant preferences, and on seasonal changes in the foraging activity of ground-foraging species. The possible impact of seed-eating by lygaeid bugs on seedling recruitment in the Park is also discussed.

Methods

Lygaeid bugs were collected on an opportunistic basis on the ground and on vegetation (mostly on species of *Leptospermum*, *Eucalyptus* and *Casuarina*) throughout Wilson's Promontory from March 1981 to December 1984. More intensive studies were conducted at adjacent *L. myrsinoides* — *C. pusilla* heath and *E. baxteri* woodland sites (each ca. 0.25 ha) at Tidal Overlook, near Tidal River (Andersen, 1986). At each site, 18 baits of *Eucalyptus* and *Leptospermum* seeds, and 15 pitfall traps (7 cm diam, ethanol used as a preservative) were established to collect seed-eating insects, including lygaeid bugs. Baits were visited on six occasions over 24 hrs (four times during the day and twice at night) each month from March 1981 to February 1982, and pitfall traps were operated over a 48 hr period each month from July 1981 to August 1983. Ants were by far the most common seed-eating insects collected, and have been described elsewhere (Andersen, in press; Andersen & Ashton, in press).

A collection of all lygaeid species collected in this study is held in the Northern Territory Museum, Darwin.

Results

A total of 22 lygaeid species from 17 genera were collected throughout Wilson's Promontory, with 16 species (all Rhyparochrominae) foraging predominantly on the ground, and 6 on vegetation (Table 1). The genus *Myocara* was the best represented, with 5 species, all of which are undescribed. Two undescribed genera were recorded, from the tribes Dilompini and Lethaeini.

Nearly all ground-foraging species were found in heaths and woodlands, and, although these habitats were sampled more intensively than any others, they appeared to be the sites of maximum lygaeid activity. *Euander lacertosus* was noteworthy in that adults occurred in vast numbers on the ground immediately following a fire at a woodland site in the northern section of the Park, although they were absent beforehand. Since immature stages were not recorded until several weeks after fire, the adults must have colonized the site from elsewhere. *Euander lacertosus* has been recorded as an opportunistic colonizer of disturbed habitats, including burnt sites, elsewhere in Australia (Cremer, 1966; Malipatil, 1979; Slater, 1976).

Most lygaeids foraging on vegetation were found on *Leptospermum* flowers and fruit, and none were found on *Casuarina*. All are phytophagous, except for *Geocoris hakeae* which is a predator of other insects (Malipatil pers. comm.). The Rutherglen bug (*N. vinitor*) was extremely abundant on *L. myrsinoides* flowers at many sites during November and December 1983.

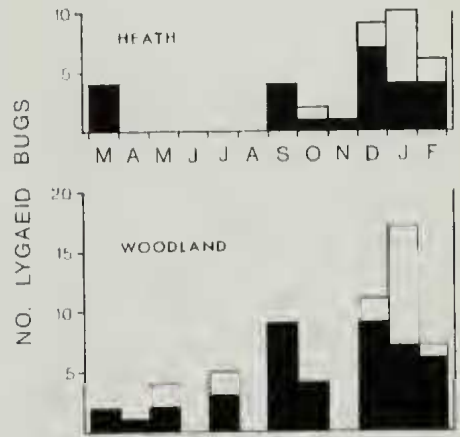


Fig. 2. Seasonal distribution of lygaeid bugs recorded at seed baits (shaded bars = total adults; open bars = total nymphs).

Table 1. Lygaeidae recorded at Wilson's Promontory. Members of the sub-family Rhyparochrominae are primarily ground-foragers, whereas all other species forage predominantly on vegetation.

SPECIES	HOST PLANT* /HABITAT
Artheneinae	
<i>Dilompus robustus</i> Scudder	Lm, Lj and Ll fruit
gen. et sp. nov. (Dilompini)	Eb fruit
Geocorinae	
<i>Geocoris ?hakeae</i> Eyles	Lm and Ew fruit
Ischnorhynchinae	
<i>Crompus oculatus</i> Stal.	Lj fruit
<i>C. opacus</i> Scudder	Lm fruit
Orsillinae	
<i>Nysius vinitor</i> Bergroth	Lm flowers
Rhyparochrominae	
<i>Austroxestus australiensis</i> Woodward	Tall Open forest
<i>Brentiscerus australis</i> (Bergroth)	woodland
<i>Euander lacertosus</i> (Erichson)	woodland (post-fire)
<i>Fontejus collaris</i> (Walker)	heath
<i>Myocara</i> sp. 1	woodland
<i>Myocara</i> sp. 2	woodland
<i>Myocara</i> sp. 3	heath, woodland
<i>Myocara</i> sp. 4	woodland
<i>Myocara</i> sp. 5	heath
<i>Neolethaeus</i> sp.	woodland
<i>Paramyocara punctatum</i> Woodward & Malipatil	heath
<i>Porander scudderi</i> Gross	woodland
<i>Pseudodryinus</i> sp.	woodland
<i>Tomocoris</i> sp.	heath
gen. et sp. nov. (Lethaeini)	heath, woodland
gen. indet. (Antillocorni)	woodland

* 1j = *Leptospermum juniperinum*, Ll = *L. lanigerum*, Lm = *L. myrsinoides*, Eb = *Eucalyptus baxteri*, Ew = *E. willisii*.

A total of 11 ground-foraging species were recorded at the adjacent heath and woodland sites at Tidal Overlook (Table 2). More individuals (50 vs 28) and species (10 vs 4) were found in the woodland than heath. The most abundant species in the heath were *Paramyocara punctatum* and the undescribed lethaeine, and in the woodland, *P. punctatum* and *Myocara* spp.

All lygaeids observed at seed baits were recorded at night, and most during the warmer months (Fig. 2). In addition to the 11 ground-foraging species, *Crompus oculatus*, *Dilompus robustus*, *Crompus opacus* and the undescribed dilompine were also collected at the woodland site,

giving a total of 15 lygaeid species re-recorded there.

Discussion

Wilson's Promontory supports a rich lygaeid fauna, with a total of 22 species from 17 genera recorded in this study. Since 15 of these species were collected from a single site (the woodland at Tidal Overlook), there can be little doubt that more intensive collections at other sites would produce many more species. Several of the species, such as *Euander lacertosus*, *Brentiscerus australis*, *Nysius vinitor* and *Porander scudderi*, are widely distributed throughout Australia (Slater, 1976); however the high incidence of undescribed taxa suggests that many species

Table 2. Numbers of adult Lygaeidae at seed baits (B) and in pitfall traps (P) at adjacent heath and woodland sites at Tidal Overlook.

	HEATH			WOODLAND		
	B	P	Total	B	P	Total
<i>Brentiscerus australis</i>				4		4
<i>Myocara</i> sp. 1				12		12
<i>Myocara</i> sp. 2					1	1
<i>Myocara</i> sp. 3		2	2	8	6	14
<i>Myocara</i> sp. 4				3		3
<i>Myocara</i> sp. 5	1		1			
<i>Neolethaeus</i> sp.					2	2
<i>Paramyocara punctatum</i>	13	3	16	11		11
<i>Porander scudderi</i>					1	1
<i>Pseudodrymus</i> sp.				1		1
gen et sp nov (Lethacini)	7	2	9	1		1
Total individuals	21	7	28	40	10	50
Total species	3	3	4	7	4	10

from Wilson's Promontory have a more restricted distribution.

What impact might seed-eating bugs have on seed supplies and consequently seedling recruitment at Wilson's Promontory? My unpublished studies of *Lepidospermum*, *Eucalyptus* and *Casuarina* show that seed-eating insects can reduce seed production by more than 70%. However the internally-feeding larvae of moths, beetles and wasps seem to be far more important than lygaeid bugs. Similarly, it is highly unlikely that ground-foraging Lygaeidae are anywhere near as important post-dispersal seed predators as seed-eating ants, whose great abundance, high levels of activity and social organization enable them to remove large numbers of seeds from the ground (Andersen & Ashton, in press).

Although in most cases lygaeid bugs probably have little impact on seed supplies, at least in comparison to other insects, there might be some important exceptions. For example, *E. lacertosus* may seriously deplete seed supplies when it occurs in vast numbers at disturbed sites, such as after fire; and unusually large populations of vegetation-foraging bugs,

as was the case for *N. vinitor* on *L. myrsinoides* flowers during late 1983, may substantially reduce seed production.

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Insect Pollinators of *Hakea microcarpa* (Proteaceae) at Bombala, New South Wales

BY GARRY WEBB*

Hakea microcarpa R. Br. is a small (<2 m) shrub, widespread at higher elevations through eastern Victoria and southern New South Wales, with scattered occurrences in South Australia, Tasmania and Queensland. At Bombala, in the New South Wales southern tablelands, it occurs on low-lying and swampy ground and commonly as remnant vegetation along roadsides in grazing land.

During December 1983 and January 1984, a small isolated patch of *H. microcarpa* along the Cann Valley Highway (ca. 20 km south of Bombala) was visited on three separate occasions to observe flower-visiting insects. Flowering was observed during mid-December but had ceased by 17 January (the last visit). All species of insect, mostly beetles, found on

flower clusters, were photographed and subsequently captured for identification. Table 1 lists all species of beetles found on *H. microcarpa* flower clusters and presumed to be potential pollinating vectors.

The most common beetle on *H. microcarpa* was *Phyllotocus rufipennis* (Boisd.). These were found scrambling over flower clusters during the day and packed tightly within clusters after dusk. Few specimens of any other insect were observed. Interestingly, the three buprestids, *Stigmodera delta* Thom., *Stigmodera delectabilis* Hope and *Stigmodera moribunda* Saunders, were apparently specific to *H. microcarpa* since none were observed on any of the array of other flowering plants examined during this period (Webb, unpubl. data). *Stigmodera octospilota* (L. and G.) and *Stigmodera sexplagiata* (L. and G.), the most common buprestids found on *Leptospermum* spp. flowering nearby, did not occur on *H. microcarpa*.

The only published records of insects on *Hakea* flowers, that I am aware of, are those of Williams and Williams (1983) for *Hakea teretifolia* at Ingleside (N.S.W.) and Ku-ring-gai Chase National Park (N.S.W.). They listed *Cis-sens notulata*, *Stigmodera sexplagiata* and *Stigmodera tricolor* as occurring on this *Hakea*. However, despite these records, it would appear from general examination of a number of *Hakea* spp. in the Sydney area, that *Hakea* may not be a common food plant. The *H. microcarpa* plants examined here produced copious quantities of nectar to which these beetles were attracted but is this a common phenomenon with *Hakea*?

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Table 1. A list of adult beetles found on *Hakea microcarpa* flower clusters

- Col: Buprestidae
 - Stigmodera delta* Thom.
 - Stigmodera delectabilis* Hope
 - Stigmodera moribunda* Saunders
- Col: Cantharidae
 - Cauliognathus pulchellus* Macleay
- Col: Cistelidae
 - Neocistela ovalis* Blackburn
- Col: Cleridae
 - Lemidia pictipes* Blackburn
- Col: Curculionidae
 - Aophoenemis rufipes* Boheman
 - Cydnaea binotata* Lea
- Col: Lycidae
 - Metriorrhynchus rlipidius* Macleay
- Col: Mordellidae
 - Mordella promiscua* Erichs.
 - Mordella sydneyana* Blackburn
- Col: Scarabaeidae
 - Phyllotocus rufipennis* (Boisd.)

* Forestry Commission of New South Wales, P.O. Box 100, Beecroft, N.S.W. 2119.